Citizens' Bulletin

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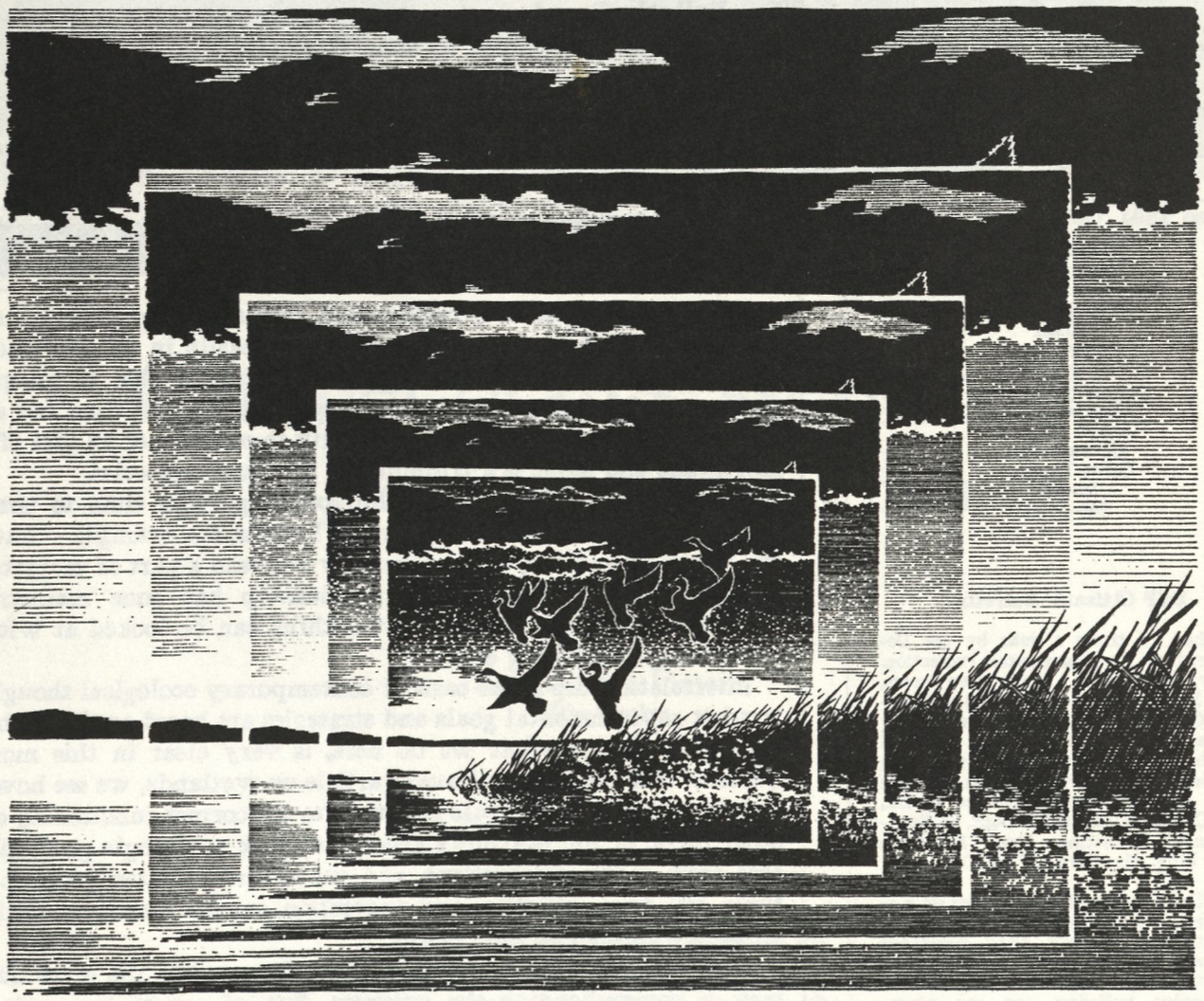
The Connecticut Department of Environmental Protection

The Wetlands



A critical link in a delicate system

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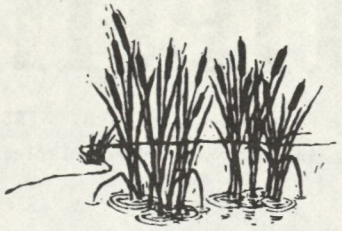

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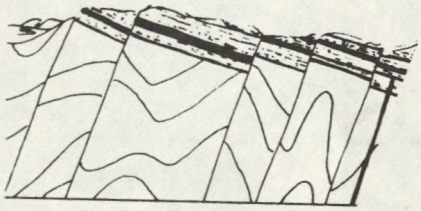

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Cover by Michael D. Klein

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DEP Citizens' Bulletin

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Editor's Note

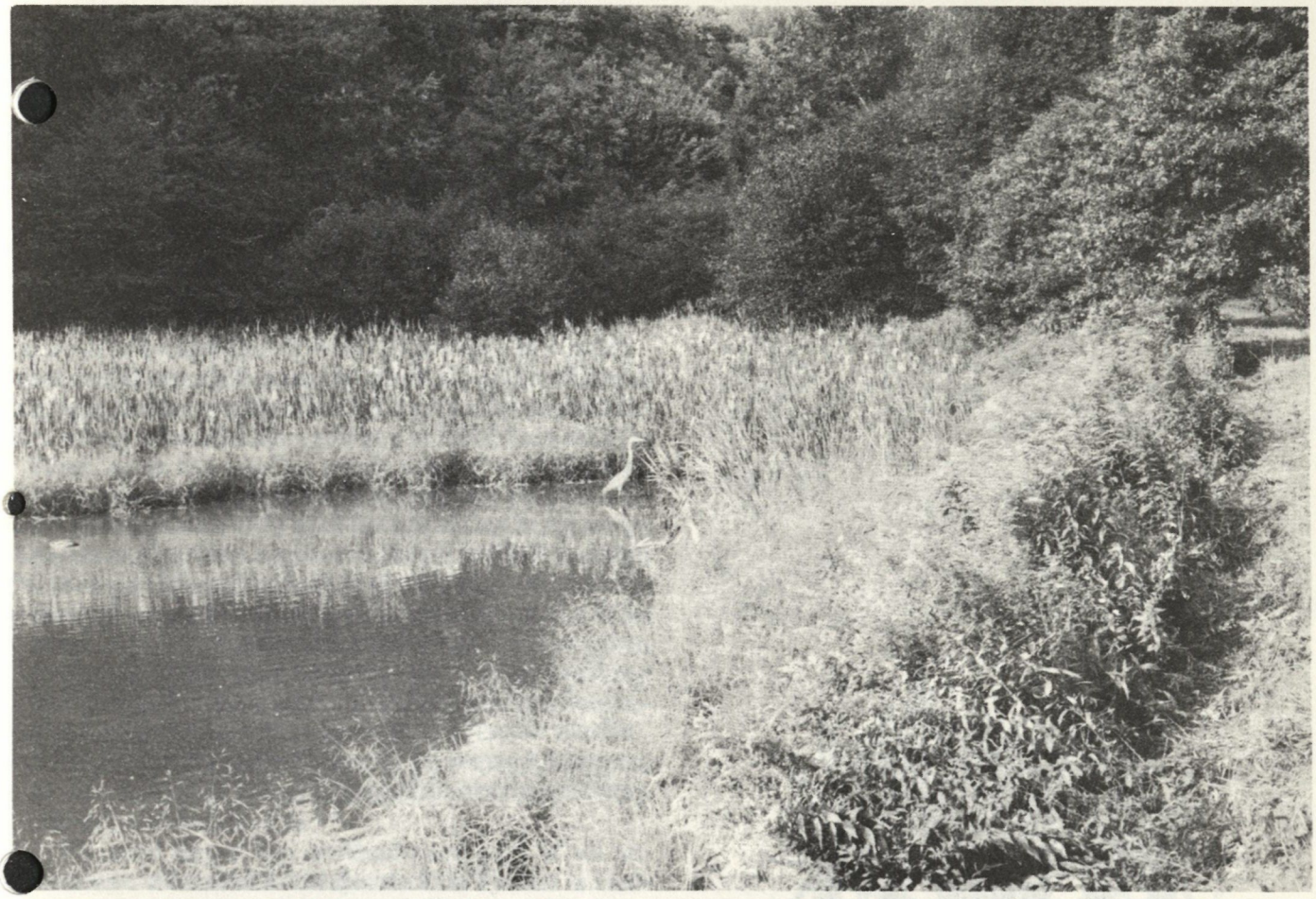
An understanding of interrelationship, that all things reflect and are reflected by all other things, does not come easily in the evolution of consciousness. Only a highly advanced being is able to grasp the rather amazing and revolutionary perception that all time and space are implicit in any one point. The ability to conceive of an idea of this magnitude and scope is a triumph for the human species.

The concept of interrelationship pops up from time to time in human history — with the American Indians, for example — but, for one reason or another, it has generally not been a part of mainstream culture. Today, however, interrelationship has gone mainstream. Modern science tells us now that nothing can be looked at without considering everything else.

Interrelationship is the basis of contemporary ecological thought. It is what environmental goals and strategies are based on. That theme, always a part of what we do here, is very clear in this month's *Citizens' Bulletin*. In Kim Nauer's article on wetlands, we see how one link in the hydrologic cycle is critical to the correct functioning of all other links. In Jim Murphy's article, we look at a single geographical area from many perspectives, and we see how water, geologic features, soil type, wildlife, and vegetation are all interconnected and mutually dependent.

Interrelationship — a significant step forward in the great human task of comprehending the universe. But, of course, we can't stop there. Now, having reached this high level of understanding, our next job is to act on it.

R.P.



Wetlands support diverse species of plant, insect, and animal life. In regulating the flow of water, they perform a vital function for waterways and shorelines.

Connecticut's Wetlands

A story of environmental balance

by
Kim Nauer
Environmental Intern
Photos by
Robert Paier

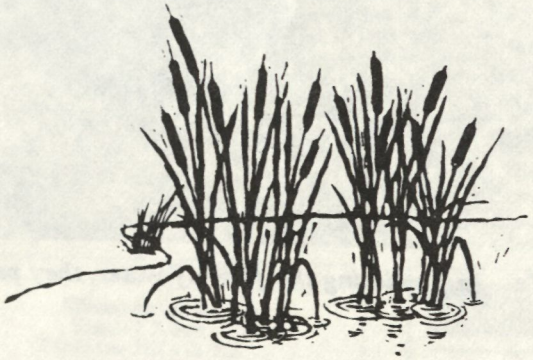
What was previously seen as an environmental wasteland is now recognized as a critical link in the hydrologic cycle.

The story of environmental awareness is fundamentally a story of growth from ignorance to understanding and, ultimately, to action. In Connecticut this progression can be very clearly seen in the case of the tidal and inland wetlands — how they are perceived, how they are used, and how they are protected.

Historically, the wetlands in our state were seen as natural wastelands. They were the mosquito-infested swamps, the "flats," unattractive places of ooze and unpleasant odors. Except for a few birdwatchers, botanists, and sportsmen, the wetlands seemed to have no real "use" in the larger scheme of things. What they did seem to be very good for was as dumps, places where any kind of garbage could be safely left and forgotten.

Bringing garbage to the marshes was not just the practice of an irresponsible few; it was explicit public policy. Zoning boards mandated that residential and industrial waste be brought to these "less valuable" areas. It was the correct and logical thing to do. It was done as a natural matter of course.

The act of bringing waste to the wetlands was an act of environmental ignorance, which had adverse effects utterly unforeseen and unsuspected at the time. Today, our understanding has grown. Today we see things very differently.



Wetlands function as part of a delicate and interrelated hydrologic system. The wetlands must be protected if that system is to remain in working order.

The Role of the Wetlands

Today, we understand that all things are connected to all other things in our earth household. We understand that water circulates in a great cycle, in the clouds, under ground, in rivers and streams, back to the sky, down to the sea, around and around. Each link in the total process is crucial to the correct functioning and health of all other links. In this very delicate and interrelated hydrologic system, the wetlands play the vital, and previously unknown, role of regulating the flow of water to and from waterways and shorelines. The wetlands, in effect, are great natural filters, removing pollutants from the surface and groundwaters which flow through them. If the system which ensures our supply of clean and safe drinking water is to be maintained, then the protection of the wetlands is absolutely necessary.

"The wetlands areas are particularly important to a healthy aquatic environment because they act as shock absorbers," says Douglas Cooper, Principal Environmental Analyst at the DEP's Water Resources Unit. "Their plants and soil soak up excess water and nutrients which are then released at times when less harm is caused to the downstream waterways."

Timing is the key to the wetlands' function, according to Cooper. During periods of dry weather, discharge of water from the wetlands supports fish populations and maintains water quality. During the growing season, when the weather is warm, nutrients

in the water are captured and used by the plant life in the wetlands. If this were not the case, if these natural pollutants were able to flow unhindered through the wetland, they would eventually reach lower streams and lakes with sudden and damaging impact. When the wetlands are healthy and functioning properly, these nutrients are released during the winter, when their impact is minimal.

A Natural Buffer Zone

Wetlands also serve as a kind of environmental sponge, without which waterways would be prone to flooding and excessive algae growth. "If a wetland is filled, as is the case in many towns," says Cooper, "there is no buffer zone in the event of a large rainstorm. The rivers then receive the brunt of the storm immediately. This results in erosion of the river bed and banks, increasing the size of the river. During the ensuing low-flow period, however, the river dries more rapidly. This creates an unattractive gulch where there was once a healthy river. This is a very undesirable habitat, and runoff streams tend to become sterile."

Directly and indirectly, then, the wetlands support diverse species of plant, insect, and animal life. They also support human life.

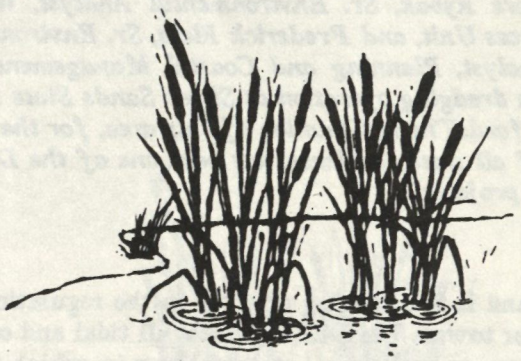
We now know the wetlands are part of an interconnected, interrelated system. The system is finely tuned and delicately balanced. If the wetlands are unable to function correctly in the system, ultimately the effects will be felt in all other parts of the system. We didn't always know that.

"A Public Good"

The Tidal Wetlands Act was passed unanimously by the Connecticut General Assembly in 1969. This Act was the expression of a growing awareness of our responsiblity for the environment. The Tidal Wetlands Act, and other wetland laws and regulations which followed, were among the nation's first legislation which explicitly defined a clean environment as a public good to be protected at the public expense.

The Tidal Wetlands Act of 1969 and the Inland Wetlands Act of 1972 established conditions and restrictions on the use of the state's wetlands and watercourses. The coastal wetlands, which had been subject to extensive commercial, industrial, and residential development, were placed under the direct regulation and supervision of the commissioner of the DEP. Inland wetland areas, on the other hand, were subject to the direct regulation of local town wetland commissions, whose programs are certified and supervised by the DEP.

At the present time, according to Cooper, the DEP oversees and assists 156 municipal wetlands commis-



"We would like to be able to catch problems with our wetlands early on, before they become major problems."

Douglas Cooper

Theodore Rybak, Sr. Environmental Analyst, Water Resources Unit, and Frederick Riese, Sr. Environmental Analyst, Planning and Coastal Management, inspect a dredging operation at Silver Sands State Park in Milford. The reclamation of this area, for the benefit of all state residents, has been one of the DEP's major projects.

sions, and is functioning directly in the regulation of 13 other towns. The DEP regulates all tidal and coastal waters, as well as all state projects in which wetlands are involved, such as the reclamation of Silver Sands State Park in Milford, and projects conducted by the Connecticut Department of Transportation.

In addition to this, the team of scientists, engineers, and surveyors of the DEP's Wetland Managment Section oversees the permitting for designated stream channel encroachment lines and diversion of water.

A major function of the Wetlands Managment Unit, according to Cooper, is to assist towns and individual property owners to comply with wetland regulations. "Often," says Cooper, "compliance is ensured at the drafting table. Engineers and landscape architects are learning to design new projects so as to minimize wetland impact and obtain state and local approval."

Fair and Correct Decisions

Violations and suspected violations are usually reported to the DEP by the town or concerned private citizens. "The complaints we get," Cooper says, "may involve something as minor as throwing brush into a wetland, or as major as constructing a roadway without a permit through a marsh."

In responding to possible violations of wetland regulations, timing is once again of importance. "We would like to be able to catch potential problems early," said Cooper. "If you can catch a violation on day it occurs, there won't be that much impact. If you catch it after 10 days, you can have a real mess on your hands."

It is for this reason that, in addition to assistance in an oversight capacity and in the permit process, the DEP must maintain a strong enforcement presence.

"The courts have been very supportive of wetland regulations," said Marla Butts, Senior Environmental Analyst at the Water Resources Unit. The right to restrict development is technically called "taking property rights, without just compensation, for the public good" — it is a legal outgrowth of restricting public nuisance. In general, said Butts, courts have understood and supported municipal wetland commissions in exercising their regulatory charge. This should result in the local commissions not hesitating to deny applications to fill or alter wetlands, providing these denials are based on sound and administratively fair judgements.

Of the total 436 permit applications processed by the DEP's Water Resources Unit in Fiscal Year 1986, 200 were inland wetland applications, with the remaining 236 involving tidal wetlands. "Of all those," said Butts, "there was only one administrative appeal. In general, people accept the DEP's decisions as being fair and correct."

Flotation devices are necessary in the dredging of Silver Sands State Park. Coastal wetland areas such as this are regulated directly by the DEP.

Far from being environmentally worthless, our wetlands are necessary to a balanced and healthy environment.

The Diminishing Wetlands

There has been, of course, a steady decrease in wetland acreage. In 1926, there were approximately 26,000 acres of tidal wetlands in Connecticut. Today, there are approximately 17,000 acres of tidal wetlands. About 400 acres, says Cooper, have been reclaimed. The tidal wetlands, Cooper points out, have historically been the most valuable and the first lost to development. This is because of the significance of Connecticut's waterfront in the overall economy of the state.

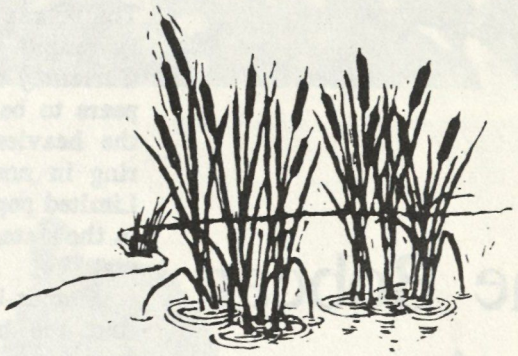
There are no exact figures for inland wetlands losses. Cooper estimates that there are 350,000 acres of inland wetland areas in the state. He also estimates that from 1200 to 1500 acres are lost each year. Inland wetlands have been subject to development to a lesser degree and later than tidal wetlands, simply because so far there has been better, drier land available for development. As the state becomes generally more developed, the inland wetlands will continue to become more economically attractive to builders.

"For Generations Yet Unborn"

There is, according to Cooper, cause for optimism in regard to the future of Connecticut's wetlands and the DEP's role, as legislative modifications will alter and expand the DEP's function of providing municipal assistance and oversight.

Cooper is encouraged by what he feels is a growing public awareness of the need to protect the wetlands. "A well-informed and concerned public is necessary to our task. The public must be behind us. Without the public, we wouldn't have any program to protect our wetlands.

"I am convinced that real progress has been made. But we need to do better, and we can do better," says Cooper. "Our mandated responsibility is to work for the benefit of generations yet unborn; we take that responsibility seriously." ■



The bobcat ranges throughout Connecticut and is considered to be the essence of wildness in any habitat it occupies. (Photos: Leonard Lee Rue III)

The Bobcat

Secretive, solitary, and strictly carnivorous

The bobcat (*Felis rufus*) historically ranged throughout Connecticut. Currently the bobcat population appears to be holding its own, with the heaviest concentrations occurring in northwestern Connecticut. Limited populations exist elsewhere in the state, primarily in the northeast.

A stout-bodied, medium-sized feline, the bobcat has a short tail, prominent face ruff, and tufts of black hair on its pointed ears. Although hair coloration varies geographically, prominent white dots on the dorsal surface of the ears occur range-wide. The sides and flanks are usually brownish black or reddish brown with distinct or faint black spots. The back is often tawny-colored with a dark mid-dorsal line. The tail displays one to several indistinct dark bands and a tip that is black on top and whitish below.

Male bobcats tend to be about one third heavier than females. Adult males average from 30 to 35 inches in length, and weigh from 18 to 40 pounds. Adult females average from 28 to 32 inches in length and weigh from 10 to 30 pounds. The skull has 28 teeth. Six mammae can be found on the female's underside.

The feet of the bobcat are well furred and highly spotted. Tracks of a young bobcat can easily be confused with tracks left by a roaming house cat. Adult house cat prints, however, are much smaller than those left by an adult bobcat. All cats have retractable claws which pivot up into recesses in the soft, padded toes for normal and very quiet traveling.

Behavior

Bobcats are primarily crepuscular, exhibiting higher activity just before dark and before dawn. They are secretive, solitary, and seldom seen in the wild, tending to travel well-worn animal trails, logging roads, and other paths. Bobcats rely primarily on their keen eyesight and hearing for locating enemies and prey. The sense of smell is not acute. Territorial and home ranges in the Northeast vary from eight to 20 square miles in size. Females tend to have smaller and more exclusive ranges than males. Daily movements of one to four miles are

(Top) A cat-like yawn. (Bottom) The bobcat is strictly carnivorous. It feeds opportunistically on a wide variety of animals and fresh carrion.

common. Bobcats may climb trees or swim to escape enemies.

Reproduction

Male and female bobcats do not form lasting pair bonds. Breeding occurs primarily between January and June. The gestation period is estimated to be 50 to 70 days. Litters contain from two to four kittens and kitten survival is a primary factor in annual bobcat population fluctuations. Mortality of kittens may be high when food is scarce. Males do not participate in raising the young. Kittens nurse for about 60 days and may accompany their mother through their first winter. Females come into heat more than once during the breeding season if not bred the first time. Females may breed before they are one year old, but generally wait until they are two years old. Males are fertile year-round, but do not breed until their second winter.

Food Habits

Strictly carnivorous, bobcats feed opportunistically upon a wide va-

riety of animals and fresh carrion (dead and decaying animal matter), but specialize in rabbit-size prey. As much as 87 percent of the diet consists of hares, rabbits, porcupines, ground hogs, and rodents, including rats, mice, and tree squirrels. Other foods include deer, opossum, raccons, wild turkeys, and other birds, and — to a much lesser extent — insects and reptiles. Bobcats also prey upon domestic species, such as small pigs, sheep, goats, poultry, and house cats. Occasionally a bobcat may kill and eat another bobcat, generally a kitten.

Habitat Requirements

In the northeastern United States, bobcats prefer mixed deciduous-coniferous and hardwood forests having brushy and rocky woodlands broken by fields, old roads, and farmland. They also frequent cedar swamps and spruce thickets. Denning sites are located in rock crevices, under windfalls, or in hollow logs. Dens are usually lined with dried grasses, leaves, and moss.

Economic Status

The status of the bobcat has changed dramatically within the past two decades. Prior to the 1970s, bobcat pelts were virtually worthless; bobcats, in general, were classified as undesirable animals which preyed upon more desirable game species. By the mid-1970s, however, bobcat pelts became quite valuable, some worth more than $100 each. At that time, the DEP reclassified the bobcat as a protected furbearer. Currently, in Connecticut, there is no open hunting or trapping season for bobcat. Studies now being conducted by the DEP are designed to increase knowledge of the population status and distribution of bobcats in the state.

The bobcat is also valued from an aesthetic standpoint. To many wildlife watchers, the bobcat represents the essence of wildness in any habitat it occupies.

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Kitten survival is a primary factor in population fluctuation. There are usually two to four kittens per litter.

Sweat Lodge

by
Edward Sarabia
Indian Affairs Coordinator

The sacred pipe, drumming, dancing, and singing have arrived at the Connecticut Correctional Institution at Somers (CCI- Somers). American Indian spiritual services are provided to the inmates. The American Indian Religious Freedom Act of 1978, passed by Congress and signed by President Carter, helped open the penal institution doors to American Indian spiritual services. The state of Connecticut is the first state in the Northeast (if not on the East Coast) to approve and offer the services; federal penitentiaries have had the services for several years.

One of the key services, if not *the* key service, is the Sweat Lodge Ceremony. It took two years to work out security problems, and to prepare the inmates for the ceremony. The ceremony is held in a "lodge" made of branches bent to form a dome-like structure and covered with material to keep in heat. The lodge at CCI-Somers is covered with blankets before each ceremony. A pit, about a foot deep, is in the center, and a small dirt mound is just outside the entrance to hold sacred items to be used by the Medicine Man or leader during the ceremony. A fire pit is about five feet away and a mound surrounds the pit to prevent the fire from spreading. A fire is built and rocks are put in it to heat them.

The fire burns for over an hour, so the rocks are hot enough for the ceremony. John Peters (Slow Turtle), Medicine Man from the Wampanoag Tribe and Director of the Massachussets Commission on Indian Affairs, supervises the ceremony, and Medicine Story, another Wampanoag Indian, actually leads or runs the ceremony.

Twelve inmates, of the some 40 inmates who attend other Indian services, regularly attend. We undress to our shorts and enter the lodge. The fire keeper brings the rocks to the lodge and puts them in the pit, and tree bark is put on each rock, and thanks and prayer are offered to the "rock people" for allowing us to use them for the ceremony. Seven to 12 rocks are put inside, and the entrance is closed so no light is allowed inside. Then the ceremony begins, with the leader saying a prayer.

Each medicine man or leader "runs" the sweat differently. Medicine Story does his ceremony in four "rounds"; the first is for physical health -- each inmate prays first for the relief of the physical problems of others, and then for his own. The entrance is then opened to allow more rocks to be placed in the pit, and then it is closed again.

The second round is to pray for mental health. With each prayer, water is poured on the rocks, creating steam and intense heat. The entrance is opened again for more rocks, and then closed. The third round is for emotional health. Again water is poured on the rocks, creating more intense heat.

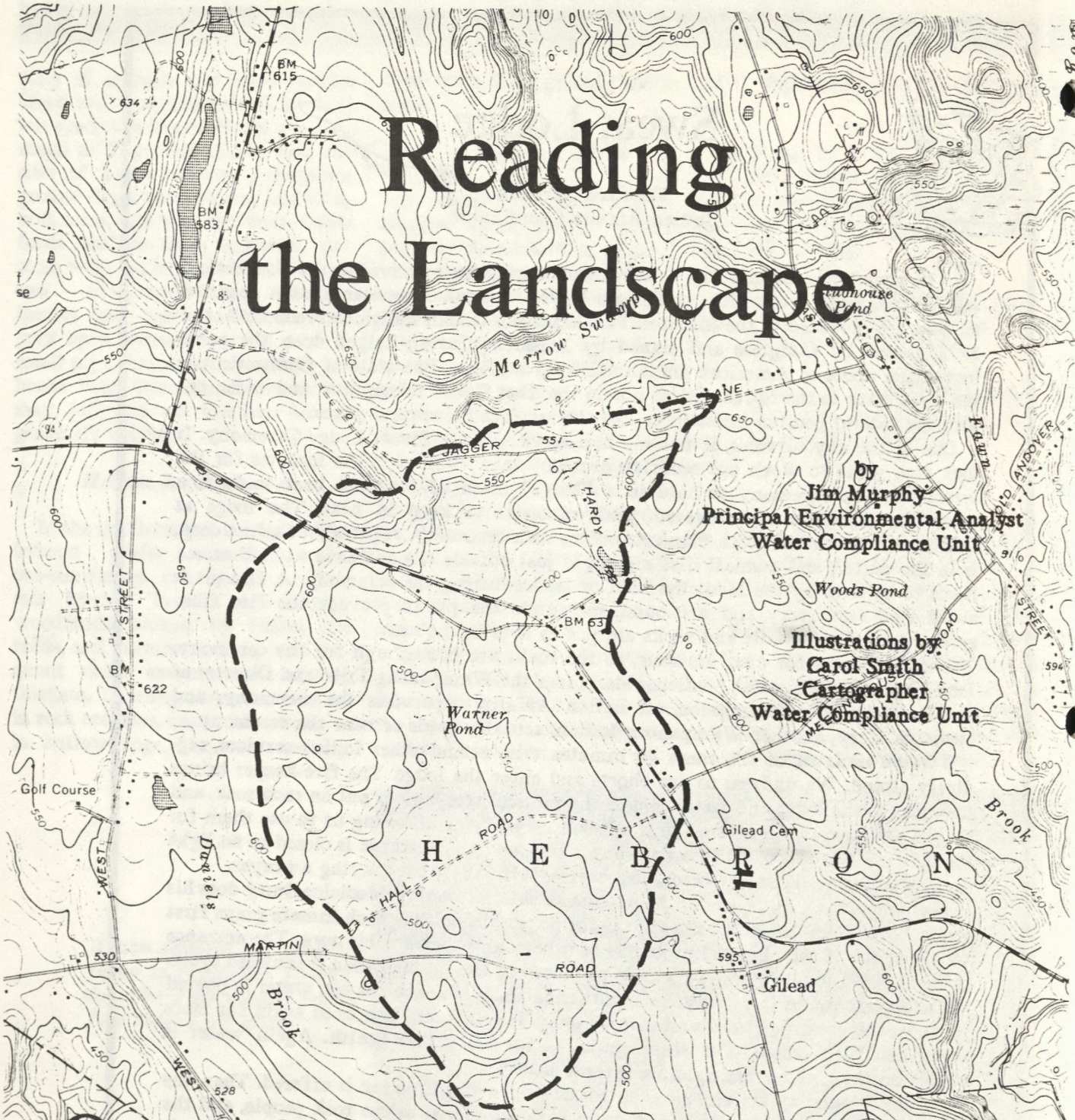
A song is sung at the end of each round and a final prayer is offered. Then the entrance is opened, rocks are added, more bark is offered to the rock people, and the entrance is closed. The final and fourth round is for spiritual health. The entrance is opened and everyone leaves.

The intense heat is the warmth of Mother Earth, and the lodge is considered her womb; so we go back to Mother Earth to purify our bodies and souls to continue being in touch with our Creator. This is an intense, spiritual experience, and can hardly be described here. The inmates are deeply touched, and have become quite protective of the Spiritual Circle. They have passed on their beliefs to others, but are concerned about others being disrespectful of the spiritual services. ■

Reading the Landscape

by
Jim Murphy
Principal Environmental Analyst
Water Compliance Unit

Illustrations by
Carol Smith
Cartographer
Water Compliance Unit



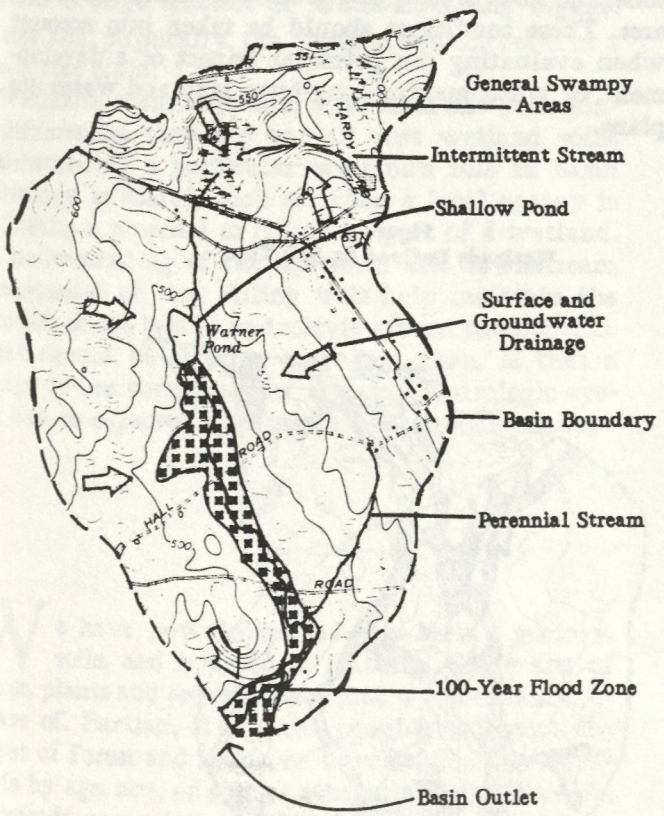
On almost any given week night, in every town across Connecticut, members of municipal boards and commissions get together for their bi-weekly or monthly meetings. These unpaid volunteers sit down and quietly, seriously, conscientiously go about the business of managing the affairs of their town. For long hours, they wrestle with subdivision applications, regulation rewrites, special permit reviews, enforcement actions, budget battles, staffing shortages, and all the other never-ending demands on their time and attention.

And, all we expect of our friends and neighbors on the town commission is that any decisions they make will preserve the character of our community, will enhance the quality of life we enjoy, will not cause us any present of future inconvenience, and will absolutely protect such environmental values as our drinking water supplies. And, as great a task as this is, it is precisely what the members of town commissions try to do for us.

It is the purpose of this article to assist land use managers to achieve the goals they have set for themselves and for their towns. This can be done by achieving a broader awareness of a town's natural features, to include wetlands, floodplains, and groundwater. In this article, then, we would like to do two things: first, we will take an in-depth look at one small area of our state in terms of the dynamic interrelationship of its natural resources; and second, we will show how local officials can use this broader perception in making management decisions and evaluating potential land use impacts.

A town's waters, land features, plants, and animals do not follow political boundaries. Rather, they result from the dynamic interrelationship among natural processes. If we can achieve a clear perception and visualization of that overall organization, then land use decisions will be more informed, consistent, and effective.

Figure 1
Major Drainage Features

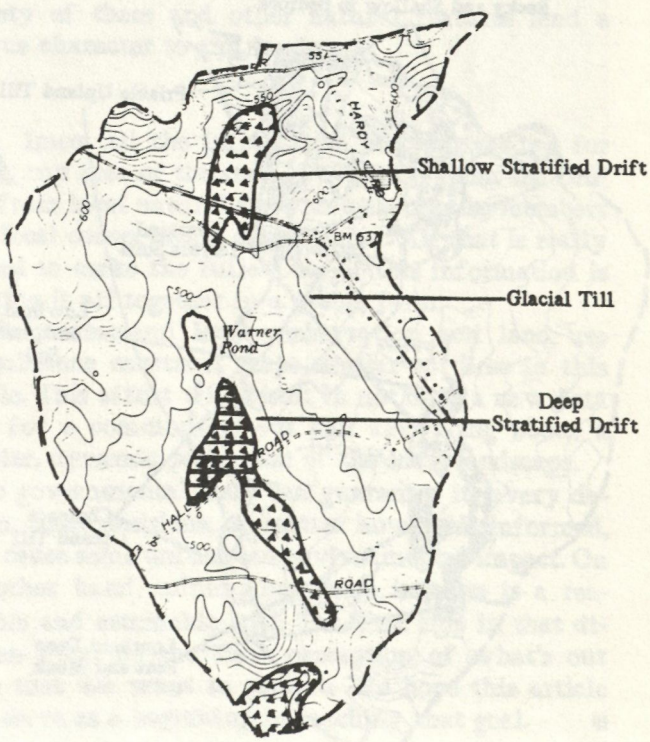


One approach to visualizing that natural organization is through the use of drainage basins. Figure 1 shows a typical small basin, the basic hydrologic land unit in which precipitation is collected. Rain which falls in the basin may take two courses: It may either run over the land and quickly enter surface watercourses, or it may soak into the ground, slowly moving through the earth until it surfaces in a wetland or stream. In a drainage basin, the surface and groundwater arrive as precipitation and leave either by evaporation or as surface runoff from the basin's outlet. A basin is a self-contained hydrologic system, with a clearly-defined water budget and cycle. Water in equals water out – the pathways are predictable.

In Figure 1, the obvious surface water features are the streams and the pond. Some streams flow only after heavy rains and during spring melt, and are termed "ephemeral." Others, which flow all year long, are called "perennial." During the warmer, drier summer months, the major portion of a stream flow will come from seepage of ground waters into streams. Warner Pond is the only permanent large water body in the basin. It is a natural, shallow, warm water pond. It provides habitat for warm water fish species, such as bass and perch.

As we know, our New England climate is variable and occasionally fierce. Periodically, major storms deposit uncommon quantities of rain, causing severe flooding. The most fearsome are the "100-year storms." Areas in the basin where these storms may be expected have been mapped. The "flood zones" are quite clearly high-risk basin segments. Figure 1 shows that risk area for this basin.

Figure 2
Basin Surficial Geology



Now, having neatly bundled the landscape into workable pieces and figured out the plumbing, we can next look at other major basin components. Dominating the area are the physical earth materials from which soils are created. Figure 2 depicts the two basic surficial geologic forms in this basin: the *glacial till*, a mixture of rock and smaller-sized materials which was spread over the bedrock (ledge) by the advance and retreat of glacial ice about 15,000 years ago; and the *stratified drift*, sand and gravel material washed into hollows and valleys as the ice sheet melted away.

These two types of earth conduct water at different rates. Till, or hardpan, is usually less than 15 feet thick, is firmly pressed onto the landscape, and is poorly suited for water supply development because it transmits water very slowly. Stratified drift, on the other hand, is usually just the opposite of glacial till, being permeable and porous. These deposits can be important water sources if they are deep and have a coarse-grained texture, such as the area just south of Warner Pond.

Most people are familiar with the concept of soil type and how different soils are shown on maps. Figure 3 consolidates the many basin soils into two major types, the *upland till soils* and the *lowland outwash soils*.

Basically, the *upland till soils* are in three groups: 1) the thinly-soiled, dry, rocky areas, where the advancing glacier scraped almost all the earth off the bedrock; 2) the tight, wet soils formed in material which was compressed at the base of the advancing ice sheet (termed basal till, or hardpan) and was pressed onto broad ridgelines; and 3) the looser, friable, and drier glacial debris dumped onto hillsides by the melting ice sheet.

The *lowland outwash soils* can also be grouped into three types: 1) the drier terrace soils formed in sand, and gravels washed into valleys by melt-waters; 2) the wet floodplain soils along water courses, periodically inundated following heavy rains; and 3) the soggy marsh and swamp soils formed in wet depressions.

This grouping helps to determine the origins of a soil group, the general physical structure of these soils, and how wet or dry we could expect to find an area. These conditions should be taken into account when evaluating the potential impact of a development, or when making long-term land and water use plans.

Figure 3
Natural Soil Groups

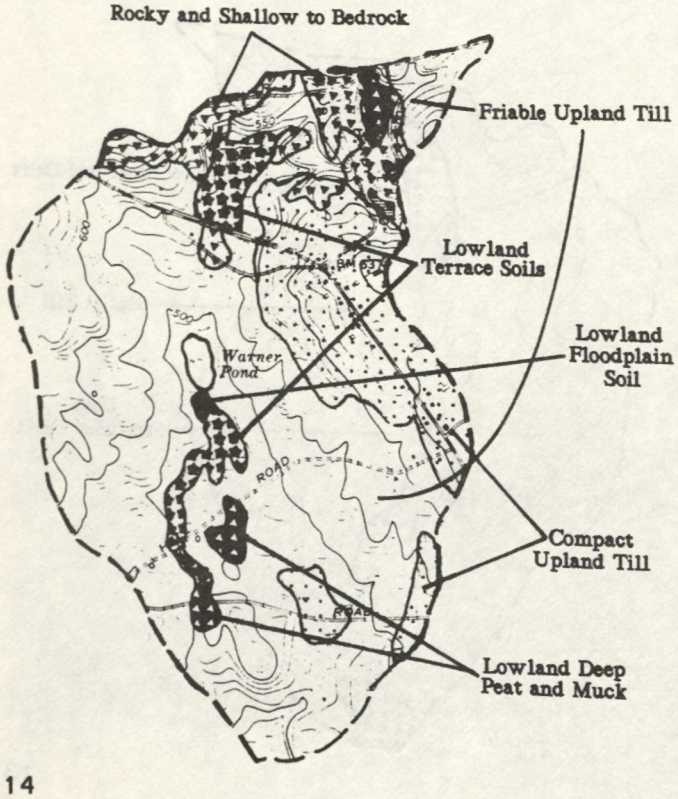
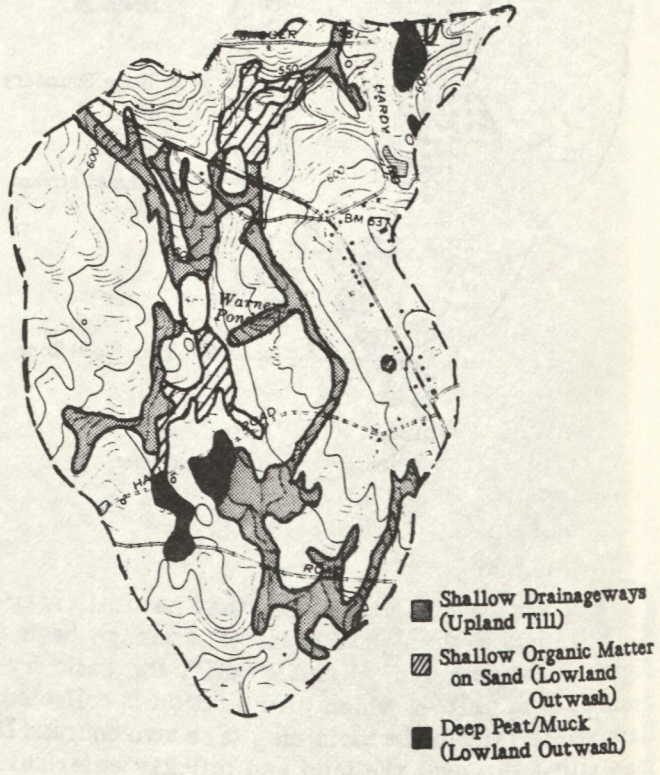


Figure 4
Wetlands Defined By Soil Type



Wetlands are significant features within any basin. Connecticut law defines inland wetlands in terms of soil drainage class – as either poorly drained or *very* poorly drained – and by the position of soils within a basin – as either alluvial or floodplain. Utilizing the soil grouping shown in Figure 3, we can classify the basin's wetland soils into two types: the *upland till wetland soils* and the *lowland outwash wetland soils*. Figure 4 depicts that grouping and tells us that not only are the wetlands physically different, they also perform different hydrologic functions in this basin.

The *upland till wetlands* appear to be acting as hydraulic conduits, collecting and channeling surface runoff. Water entering these wetlands doesn't remain long, because this wetland type is found on the sides of hills, the soil is made up of relatively impermeable glacial till, and physically, the wetland has the form of a narrow chute.

The *lowland outwash wetlands*, on the other hand, appear to act as natural catch basins in which water can spread out during heavy rains. Water entering these wetlands may be detained because the wetland occupies low-lying areas and depressions, the soil may contain a large amount of water-absorbing organic matter and, physically, the wetland has the form of a broad, flat plain.

Wetlands, then, have both structural and functional differences; they are not all just wetland soils. Understanding a particular wetland's role in basin hydrology is useful, such as when a local agency is reviewing a proposal to fill all or part of a wetland. An understanding of the upstream and downstream consequences of that filling will help maintain the function of the basin's hydrologic system components. What should be clear to managers, then, is that a change in one component of a basin's hydrologic system can be expected to impact all other components.

We have now looked at this basin's geology, soils, and hydrologic features. There are, of course, plants and animals here that we should also be aware of. Further, it is quite possible to depict the extent of forest and fields, or to subdivide the woodlands by age, size, or species composition (hardwoods, softwoods, or a mixture of the two).

There are other natural characteristics within the basin which we could identify and map. We could locate rare and endangered species habitats, unique plant communities, locations of caves, cliffs, ravines, springs and water falls, and, of course, the best fishing holes. As an example, we will show how this can be done with just one of the basin's biological communities.

Figure 5
Wetland Vegetation Types

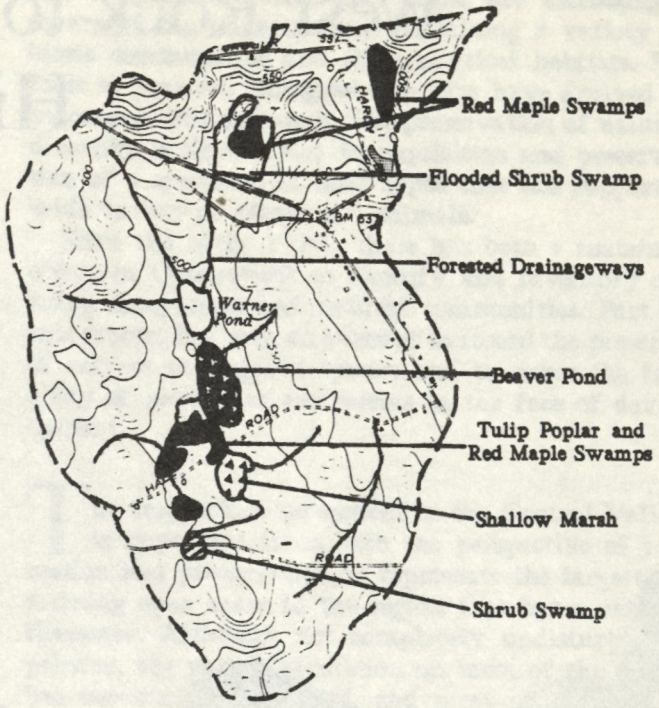


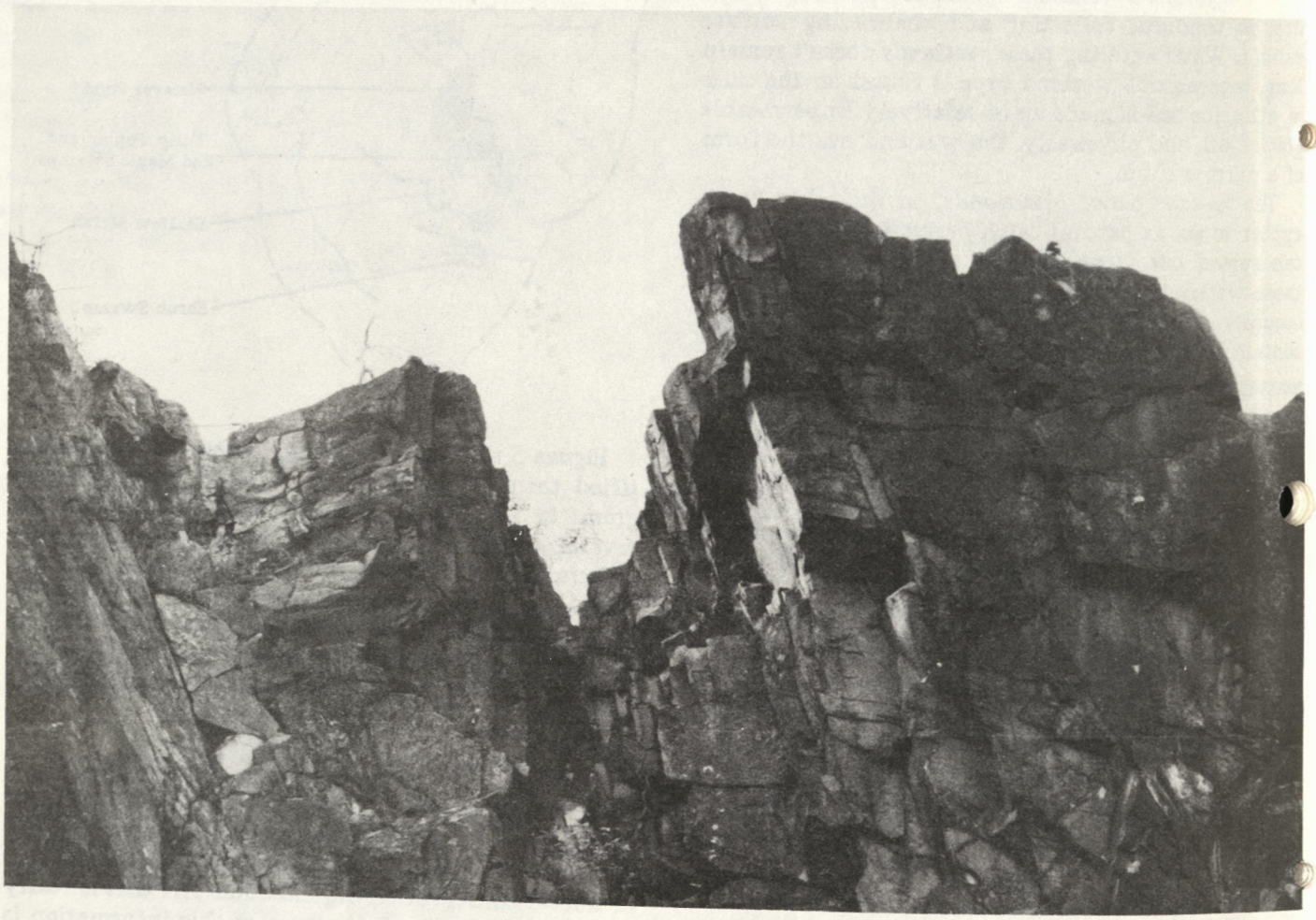
Figure 5 shows the wetland vegetation types identified through the national wetland inventory program. In this small basin, it is apparent there are several wetland groupings which represent not only unique plant communities, but also hint at the location of different animal populations. This inventory reveals the natural diversity that is possible in even relatively small land areas. The abundance and variety of these and other natural features lend a unique character to any landscape.

Almost all the information described above, for any area of the state, is available from the DEP and from local naturalists who may now be members of a local conservation organization. All that is really needed to make the fullest use of this information is to bring it all together in a usable form.

We recommend local conservation and land use commissions construct maps similar to those in this article. This effort will result in not only a new data base for a community, but can also bring about a broader, dynamic perception of the local landscape.

No governmental body can guarantee its every decision. Some decisions, no matter how well-informed, may cause some unforeseen environmental impact. On the other hand, minimizing these impacts is a reasonable and attainable goal. The first step in that direction must be the clear perception of what's out there that we want to protect. We hope this article will serve as a beginning in reaching that goal. ■

West Rock to the Barndoor Hills



The Traprock Ridges of Connecticut

Text and Illustrations
by

Cara Lee

Traprock ridges are among Connecticut's critical habitats. They harbor unusual plant and animal communities, as well as rare and endangered species. They add to the richness and diversity of the state's natural environment, and they offer spiritual refuge for people seeking respite from their man-made surroundings. And, too, these habitats are threatened by the constantly increasing pressures of use and development.

Excellent opportunities for rock climbing are found at Ragged Mountain, Berlin.

The Connecticut Natural Heritage Program in the DEP is committed to preserving these habitats, as well as rare and endangered species and other critical natural resources. The book West Rock to the Barndoor Hills: The Traprock Ridges of Connecticut introduces readers to the ecology and geology of Connecticut's traprock ridges. The following article originally appeared in that publication.

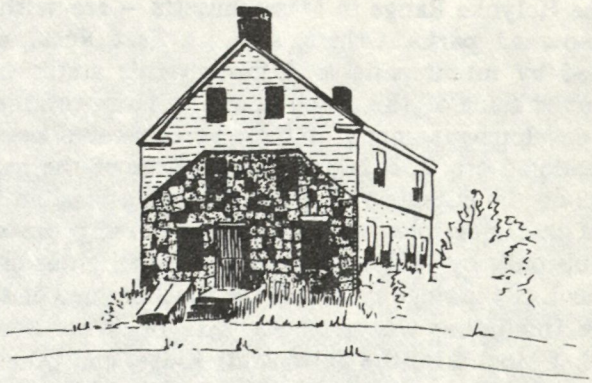
As population has grown in the New England region, development of land for housing, industry, utilities, and roads has diminished and splintered our open space resource. This loss is felt profoundly by people seeking the out-of-doors for visual or spiritual refreshment and recreation. As borders of one urbanized area bleed into the next, it seems that "no matter where one goes, nature is somewhere else." (D. Ehrenfeld). In a state as densely populated as Connecticut, it is clearly in the public interest to set aside and preserve natural lands for recreational purposes now and in the future.

Concern for the preservation of natural areas extends well beyond recreational considerations. Having witnessed local or global extinction of flora and fauna due to habitat destruction, people are increasingly aware of the importance of sustaining a variety of biotic communities and their physical habitats. Efforts to preserve biological diversity have evolved to encompass this approach. The preservation of natural diversity is now rooted in acquisition and preservation of a spectrum of land types that can support a wide variety of plants and animals.

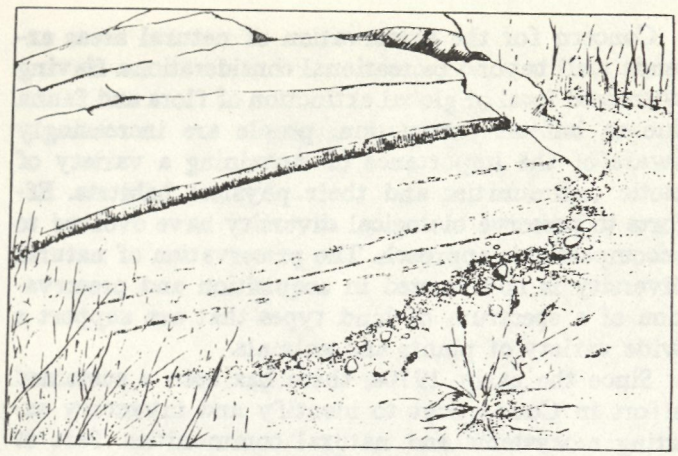
Since the early 1970s, there has been a sustained effort in Connecticut to identify and inventory existing ecosystems and natural communities. Part of this process has been an attempt to record the presence of rare or endangered species and to assess the fragility of particular ecosystems in the face of development.

The traprock ridge system in the Central Valley is important from both the perspective of recreation and preservation. It represents the largest remaining open space in the region that has a natural character. Although not completely undisturbed or pristine, the native vegetation on most of the ridges has become re-established, and most of these areas have retained or regained a natural quality. Since the ridges are set in the heart of the well-settled Central Connecticut Valley, they are extremely important recreational areas because of their scenic qualities and their accessibility. In addition, the ridge system represents a habitat that supports remarkable natural diversity. For these reasons the system deserves preservation consideration. Of course, these two interests, recreation and preservation, can be conflicting. In order to manage the land for both, planners will depend on detailed knowledge of the ecosystem, ownership, and recreational use patterns.

On the basis of detailed studies by botanists and plant ecologists over many years, it is generally



A farmhouse with traprock endwalls North Haven, Connecticut



Scratches made by the movement of glaciers are visible on some traprock outcrops.

agreed that the rocky summits of the ridges are the most fragile part of the ridge ecosystem and are the areas most threatened. For a variety of reasons, it is here that many of the rare and unusual plants associated with the ridges are found. Recreational use can pose a threat to these plant communities simply because of the damage caused by the scuffle of human feet. Many of the plants found in the harsh environment of the ledgetops are small and easily trampled. Once dislodged from the typically thin soils, they may fail to become re-established. Another threat to the ridgetop plant community stems from recreational use of fire. Campfire rings casually constructed of basalt chunks are frequent testimony to the popularity of trailside fires. The dry and windy conditions that prevail on the summits allow fires to spread quickly and burn hot, devastating the sparse woodland community of the summit.

Control of the development and intensity of recreational use of the ridgetops has been determined in great part by their ownership. Many of the ridgetops of the Metacomet Ridge — running from Branford, past Meriden, through Hartford, and north to the Holyoke Range in Massachusetts — are within state-owned parks. Others, such as East Rock, are owned by municipalities. Although this status has protected some of the rocky summits from commercial development, many of these areas receive heavy recreational use. This is particularly true of the park peaks on the outskirts of cities that are accessible by car. Other ridgetops within state ownership are accessible only by hiking trails and receive lighter use.

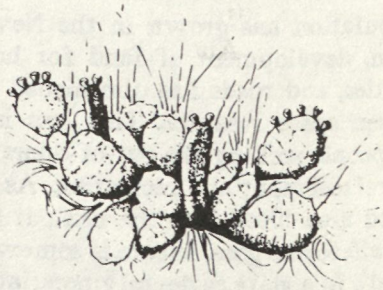
Much of the ridge system at the southern end of the range (including the northern half of West Rock, Totoket Mountain, the Saltonstall Ridge, and others) is owned and managed by the South Central Regional Water Authority as watershed surrounding its reservoirs. For the most part, there is no public access to its properties. In addition, the Water Authority has policy goals that specify preservation and protection of the ridges for their scenic quality and as critical habitat. Due to these policies, the ridgetops that are owned by the Water Authority experience minimal disturbance. Portions of Talcott Mountain are similarly owned and managed by the Metropolitan District Commission of Hartford. These areas are open for recreation but are primarily managed as watershed protection areas.

Three areas in the state that have been set aside as refuges are on traprock ridges. They include McLean Game Refuge, which encompasses the eastern Barndoor Hills (running from Simsbury north to the Massachusetts border), and two Nature Conservancy preserves, Higby Mountain and Onion Mountain. The public is welcome to hike at these locations, but the preserves are not managed primarily for recreation.

Thus, the patterns of utilization, development, and recreational use of the ridges span a spectrum that includes near-zero to heavy use. In order to manage this remaining open space effectively for recreation and preservation, a variety of management strategies are needed. As more is learned about the exact location of particularly valuable ecological areas, this information can be "mapped" against current recreational demands. Using this kind of information to assess the ecosystem as a whole, it will be possible to plan to divert the distribution of recreational use away from ecologically sensitive areas, thus minimizing ecological impact on the system. Determining the desirability of areas for recreation and their ecological significance is an essential step toward an overall management plan that will best preserve Connecticut's natural heritage while providing its citizens with opportunities to enjoy and learn about the natural world.

■

West Rock to the Barndoor Hills: The Traprock Ridges of Connecticut is a publication of the State Geological and Natural History Survey and the Connecticut DEP. This and other publications and maps are available from the DEP Natural Resources Center, Room 555, 165 Capitol Avenue, Hartford 06106. Telephone: (203) 566-7719. ■



Patches of prickly pear cactus are found on West Rock.

State's Landfill Capacity Studied

by
Leslie Lewis
Citizens' Participation
Coordinator

"Solid waste crisis predicted."
"Landfills running out of room."
"Town has nowhere to send trash."

These headlines and others have been appearing with alarming frequency over the last year or so. In fact, the DEP has been trying to alert the public to the problem of shortages in solid waste disposal capacity for a decade. Now the Connecticut Audubon Society has issued a report which supports many of the DEP's forecasts.

The report, *Landfills in Connecticut: A Vanishing Resource*, is the result of long hours of study and research. Its main focus is an assessment of remaining landfill capacity in the state, and the impact of future solid waste management strategies on landfill life.

The data compiled by Connecticut Audubon staff point to 1994 as the year when landfills will be completely full. While this does not exactly correspond with the dates the DEP has been using, Audubon points out that their estimates are extremely optimistic. They stress that no matter whose figures are being used, land disposal capacity is due to expire in the very near future.

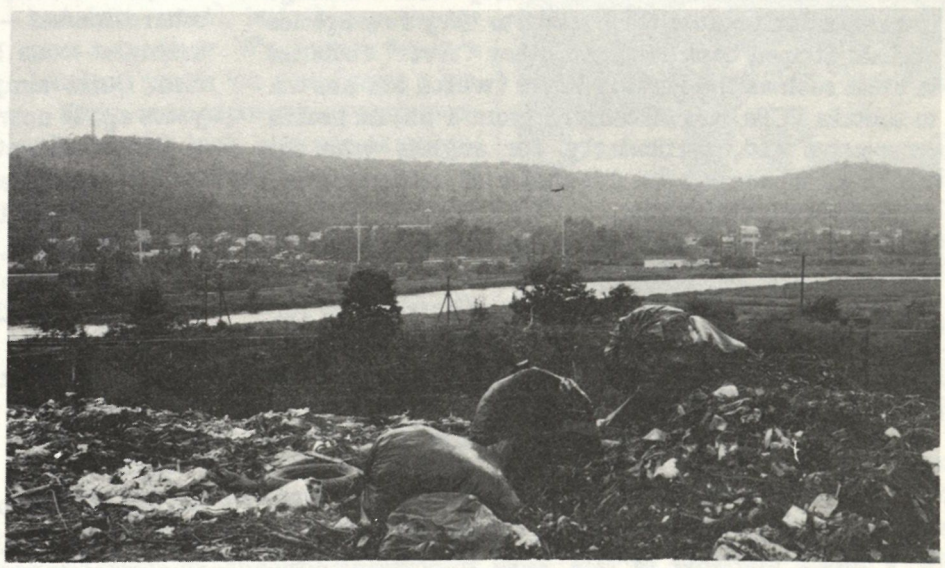
The report is not all gloomy, however. Connecticut Audubon's research suggests that some steps can be taken to maximize landfill life. The following conclusions are presented and discussed:

- The incorporation of a statewide recycling effort that would reduce the waste stream by 25 percent (by weight) would extend the state's landfill capacity to 1997.
- The incorporation of all operating or planned waste-to-energy facilities would extend landfill life to 2011.
- An integrated approach, combining recycling and waste-to-energy, is shown to be the most powerful strategy. Not only would landfill capacity be extended to 2048, but the use of recycling would reduce the amount of waste to be landfilled or burned, mitigating the hazards of each of these methods.

Connecticut Audubon also makes a number of recommendations for improving solid waste management in Connecticut. These recommendations include:

- Integration of waste disposal strategies;
- Enforcement of existing landfill regulations;
- Implementation of effective public education regarding solid waste disposal management;
- Enforcement of existing landfill regulations;
- Improvement of solid waste information management;
- Requirement of annual topographic surveys of all landfills in the state;
- Development of a list of closed landfills and formulation of strategies to guard against water pollution from these sites.

Disposing of our garbage in an environmentally sound and socially acceptable way will continue to be a challenge. Connecticut Audubon is one of the first private organizations to evaluate the problem in a comprehensive manner. The entire report can be obtained by contacting the Connecticut Audubon Environmental Center, 118 Oak Street, Hartford 06106, or phoning (203) 527-6737. ■



No matter whose figures are used, landfill disposal capacity is due to run out soon.

Eating Fish Is Still Good For You

by
Eric M. Smith
Assistant Director of Fisheries
Marine Fisheries Program

Much has been said recently about public health and fish consumption. Fisheries for striped bass in New York and Rhode Island have been closed due to polychlorinated biphenyl (PCB) contamination, and advisories against consuming too much striped bass have been issued in Connecticut and other states for the same reason. Moreover, other contaminants have been suggested as potential carcinogens in New York and New Jersey.

On the other hand, it is wise to keep these warnings in perspective because they relate to very few species of fish. Striped bass, eels, and other "river" fisheries in areas such as the Hudson River (which are known to contain PCBs) are of concern from a public health perspective and, particularly, for anglers who are likely to consume high quantities of estuarine fish from contaminated areas.

In contrast, virtually all of the species routinely consumed by New England seafood consumers — flounder, cod, haddock, and many others — are relatively "contaminant-free" according to present standards and current knowledge. It is important, therefore, that the public recognize the advantages as well as disadvantages of seafood consumption.

Seafood is high in protein, vitamins, and minerals, and low in fats. Most important, however, is recent medical research which indicates that fish oil, high in unsaturated fats known as "Omega-3 fatty acids," can affect blood chemistry to reduce the chances of heart failure.

Researchers have noted that Eskimos in Greenland and fishermen in Japan have a far lower incidence of cardiovascular problems than do residents of western nations. Moreover, within a given population, it has been found that middle-aged men who consume fish as a normal part of their diet are less prone to heart disease than men who consume little or no fish. Finally, researchers have found that the aggravations of other illnesses — arthritis and migraine headaches, for example — can be moderated by diet which includes fish. Quite simply, what was common knowledge years ago is now being confirmed by medical research — fish consumption is good for you.

The most beneficial kinds of fish are the cold oceanic species like tuna, salmon, mackerel, and sardines. However, all seafood species — even those like lobsters, crabs, and shrimp which in the past were of concern due to their high cholesterol levels — are beneficial, based on their content of Omega-3 fatty acids. And, more recently, even these latter species have been found not to contain as much cholesterol as one egg does.

As a result, there's a lot of good to come from eating seafood and, from a fisheries perspective, our objective of supporting properly-managed and productive Connecticut seafood-producing industries — both commercial and recreational — is well worth our effort. ■

Finding Where We Agree

The American Sportsman and the Origins of Conservation
By John F. Reiger
316 pp. Norman and London: University of Oklahoma Press

by
Robert Paier

One of the touchiest, most hotly-debated issues in today's environmental community is the clash between those who are pro-hunting and those who are anti-hunting. It is a significant issue, not only in its own right, but also because it has sharply polarized people who share a deep and fundamental dedication to making the world better. The closer these two camps can get, the more they are able to move beyond their differences and focus on the common goal, the better for everybody. Socrates tells us we should find out where we agree. John Reiger's book, *The American Sportsman and the Origins of Conservation*, is a step in that direction.

Dr. Reiger is the executive director of the Connecticut Audubon Society in Fairfield. His book, originally published in 1975, and now rereleased in paperback, is a careful, well-researched study of a subject which has tended to elude rational treatment. Some will find this book enlightening.

Dr. Reiger's thesis is that the origins of the American conservation movement can be traced directly to the sport hunters and fishermen of the 19th century. It was the sport hunter – and most emphatically not, according to Reiger, the market hunter or the "wanton" hunter – who first perceived and acted upon the necessity of limiting human impact on the environment.

The period on which the book focuses is roughly from 1860 to 1910. It was during the 1860s that sportsmen, perceiving a threat to a cherished way of life, began to articulate a code of hunting and fishing ethics. Reiger discusses initial efforts to protect wildlife from extinction at the hands of the market hunters and then, by extension, later efforts to preserve forestlands. This lead eventually to the development of the national park system. Of signal importance in creating a national conservation policy was the Boone and Crockett Club, of which George Bird Grinnel (also founder of the Audubon Society) and Theodore Roosevelt were founding fathers. This organization was pivotal in formulating the first effective national conservation policies.

The author has also assembled a large collection of photos and woodcuts, and a full bibliography.

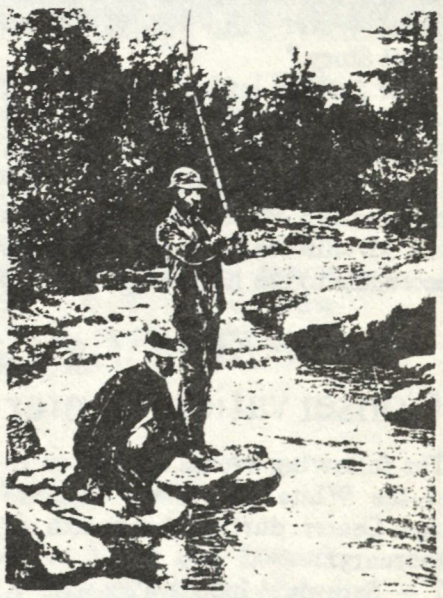
What is so consistently fascinating about this book is that through extensive quotation of contemporary periodicals it allows the reader an insight into the mind of another time, when things were simpler, when people used such terms as "honor" and "courage" without apologizing. The code of the sportsman may seem naive today ("sportsman" is an unfortunate term – things might have been different if the word "outdoorsman" had been used), but things change over a century. We learn a lot in a hundred years; we also forget a lot.

Some contemporary environmentalists will look askance at points the author makes about the code of the hunt, or the hunter's "love of the quarry." On the other hand, Dr. Reiger shows that it was clearly these hunters who established the basis for environmental thinking and policy to follow.

It is to Dr. Reiger's credit that he doesn't over-idealize the early conservationists. They did not, for example, have a perception of interrelationship, which is the basis of "ecological" consciousness. On this level, the sportsman's understanding was fundamentally a reflection of a personal desire for a "good hunt." Ecological thinking, with its emphasis on stewardship, was to come later.

What makes this book clearly the work of a serious historian is that Dr. Reiger looks at the past in its own context; he does not fall into the trap of imposing current standards on past events. And, along that line, it is appropriate that current thinking be more advanced and comprehensive. The student should always surpass the teacher; we should be growing. But it is also important and correct that respect be paid to the sportsmen of other times. While their understanding may seem narrow by today's standards, the sportsmen of that era may still have something to teach us of nobility and honor.

It is unlikely that anyone will be converted, one way or the other, by this book. The issues involved are much too visceral for that. On the other hand, a little mutual understanding goes a long way. We can be grateful to Dr. Reiger for making that possible. ■



"Trouting," from Henry Van Dyke's *Little Rivers* (1895). Van Dyke conveyed the beauty, even spirituality, of sport fishing. From John Reiger's *American Sportsman and the Origins of Conservation.*

The Bulletin Board

American Indian Archaeological Institute

The following events are planned at the American Indian Archaeological Institute:

Saturday and Sunday, February 7 and 8, 2:30 p.m. Small World Film Festival: "A Place in Time" documents the growth of historic preservation in the U.S.

Saturday, February 7, 1:00 p.m. Winter Survival Walk: Identification of animal tracks, obtaining drinking water, and finding nuts, tubers, and roots.

Friday, February 13, 10:30 a.m. and Saturday, February 14, 1:00 p.m. Indian tales about insects.

Saturday and Sunday, February 14 and 15, 2:30 p.m. The Small World Film Festival: "Courtship and Marriage around the World."

Saturday and Sunday, February 21 and 22, 2:30. The Small World Film Festival: "George Washington — the courage that made a nation."

Saturday and Sunday, February 28 and March 1, 2:30 p.m. The Small World Film Festival: "The Fossil Story."

For further information, contact AIAI, Route 199, PO Box 260, Washington, CT 06793 — phone (203) 868-0518. Admission is by membership or donation: $2/adults and $1/children, ages 6-18. AIAI is accessible to the handicapped. ■

White Memorial Conservation Center

The following events are scheduled at the White Memorial Conservation Center during the month of February:

7 — Saturday Indoor Program: A brief history of navigation, Jim Waite, 2 p.m., Mott-Van Winkle classroom.

10 — From February 10 through 13, there will be outdoor activites for children, including a winter scavenger hunt, story hour, cross country ski trip, and snow sculpture. Call the Center for details and to register.

14 — Saturday Nature Program: Ocean kayaking and glacier skiing, David Moskiowitz, 2 p.m., Mott-Van Winkle Classroom.

15 — Sunday Outdoor Program: Nature walk on skis, Paul Gros, 2 p.m., museum entrance.

21 — Saturday Nature Program: Touring the Grand Canyon, Richard Bacca, 2 p.m., Mott-Van Winkle Classroom.

28 — Saturday Nature Program: Helping the bluebirds workshop. Short program at 2 p.m., Mott-Van Winkle Classroom, followed by birdhouse-building workshop, Larry Mencuccini, Activity Shed; kits — $3 .00 each.

The White Memorial Conservation Center, Inc., is located on Route 202 in Litchfield. For further information call (203) 567-0015. ■

State Museum of Natural History

On Monday, February 2, 12-4 p.m., in the Wilbur Cross Building, University of Connecticut, Storrs, the Connecticut State Museum of Natural History will have a special exhibit of "Videoplace," an experiment in "artificial reality" which allows people to see themselves as a computer might see them.

On Sunday, February 15, the Museum and the UConn Co-op will sponsor a lecture/booksigning by Harry S. Stout, Professor of Religion, Yale University, author of *New England Soul*. Dr. Stout will discuss his findings that sermons were a major form of communication among early New England Colonists. The lecture will be held in the Benton Connecticut Art Gallery, Jorgensen Auditorium Building, University of Connecticut, Storrs, at 3:00 p.m. Admission is free and refreshments will be served.

For further information, please phone (203) 486-4460. ■

Copernican Space Science Center

The Copernican Space Science Center in New Britain announces the following upcoming events:

In February, two planetarium shows will take place. "Vistas," dealing with the scientific and economic aspects of space travel, will be presented on Fridays and Saturdays at 8:30 p.m. A childrens' show, "A Child's Universe," will be presented on Fridays at 7 p.m. Admission is $2/adults and $1.50/children and senior citizens.

Following each planetarium show, the observatory's 16-inch telescope will be open to the public from 8 to 10 p.m.

For more in-depth instruction, the telescope will be open the first Wednesday of each month, from 8 to 10 p.m., *weather permitting*. Admission is $2/adults, $1/children, and is limited to 10 people. Preregistration is required.

The Science Center also sponsors "star parties," for first-hand star gazing. These events are scheduled for February 21, at Harkness State Park, and March 21, at Hammonassett Beach State Park, from 8 to 11 p.m. Admission is free, but donations are welcome. Phone the observatory for further information.

This spring, an eight-week extension course in astronomy will be given by Dr. David H. Menke, executive director of the Center. For further details, phone the Center or the extension college at 827-7422.

The Copernican Space Science Center is located on the Central Connecticut State University campus in New Britain. For further information, please phone 827-7852 or 827-7419. ■

Note: Bring this issue of the Citizens' Bulletin to any of the Space Center programs listed, pay for one admission, and get a second admission free.

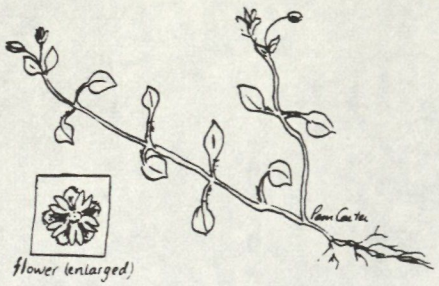
Trailside Botanizer

Chickweed

by
Gale W. Carter
Illustration by
Pam Carter

Few plants are as common or as hardy as chickweed, a member of the pink family. Its distribution is world-wide and it even grows near the Arctic Circle. Commonly, it is found on lawns, gardens, waste places, and roadsides.

Chickweed has some remarkable adaptations which help to explain why it is so wide-spread. Its flowering season includes most months of the year. This produces a great many seeds. Even in mid-winter it may be found blossoming in sheltered sites. During severe weather, the plant is able to survive because the hairy lower leaves envelope the younger leaves at the top and protect them.



Chickweed is a small, weak-stemmed plant with many branches that can also produce new plants when a stem bends over and touches the ground.

The genus name, *Stellaria*, in Latin meaning star-like, refers to the appearance of its flowers. *Media* means middle-sized, in comparison to the many other species of chickweed.

In the common chickweed, there are five deeply-cut, white petals. This gives the appearance of being 10-petaled. Its five green sepals extend beyond the petals. The flower has three styles extending above the ovary. Some closely-related species of chickweed belonging to the genus *Cerastium* have five styles.

Medically, chickweed has been used as a household cure for a variety of irritations of the skin. It can be used in salads and as a potherb.

Chickweed has long been used for feed for chickens and wild birds – hence, its common name. Today, feed containing chickweed seeds is given to poultry raised in close quarters for mass production, in order to stimulate their appetite.

Because of its many uses, it is believed that early Puritan women may have brought chickweed with them from England to plant in their gardens. If so, it has since escaped to other sites where it is less desirable. ■

Endnote

In the days of Captain Kidd, he and other buccaneers used to come up the Thames River in their boats and lie to during the periods of pursuit. Up there among the Indians, they could pass the time pleasantly, and also find secluded regions wherein to bury their booty. So the Mohegans have some tales of these visits from the pirates which have furnished the motive for many nightly excursions to dreamt-of spots where treasure is thought to exist. Until this day, futile attempts are made to lay hands on some of the gold that is said to be buried along the river shores.

One time, two Mohegans, having dreamed of a certain spot where Kidd's money was buried, went down to the river with spades. They began their trench, and soon had the good fortune to disclose the top of a great iron box with a ring in it. Their surprise was so great that one of them said, "Here it is." At that moment a tremendous black dog appeared at the rim of the pit and growled. At the same moment, the chest vanished. The men were so terrified that they never tried to find the place again.

Sometimes the animal, instead of being a black dog, is a pig, and it has even been reported as a terrible-looking man with long robes and clotted hair. It is explained by the belief that Kidd, when he buried his loot, always killed some animal or man and threw him into the pit in order that his spirit might guard the spot.

Frank G. Speck

Native Tribes and Dialects of Connecticut: A Mohegan-Pequot Diary (Quoted in *Spirit of the New England Tribes*, by William S. Simmons, University Press of New England, 1986.)

Photo: Irene Vandermolen

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